

REMARKS

Claims 1-76 are pending in the application. Claims 1, 24, 26, 29, 30, 31, 33, 34, 46, 47, 48, 49, 50, 51, and 65 are amended herein.

Drawing Objection:

The Patent Office objected to the drawings under 37 CFR 1.83(a) because “the orthogonal translation between the first and second substrates must be shown or the feature(s) canceled from the claim(s) (e.g. claim 4).”

Applicant respectfully submits that, contrary to the Patent Office’s characterization, orthogonal translation between the first and second substrates can be seen with reference to Figs. 5 and 6. Particularly, Fig. 6 shows a cross-sectional side view of vertical grooves 604 that intersect horizontal grooves 616, wherein the vertical groove on a first substrate 618 can be seen to interact through the friction reducing element 606 with horizontal groove 616 in the second substrate 615. It should be clearly recognized by persons having ordinary skill in the art that such configuration of intersecting grooves allows orthogonal translation of the first substrate relative to the second substrate.

The Patent Office further objected to the drawings under 37 CFR 1.83(a) because “basechip having base grooves ... to provide channels’ must be shown or the feature(s) canceled from the claim(s) (e.g. claim 24).”

Applicant respectfully submits that contrary to the Patent Office’s characterization, Fig. 8 shows a basechip having fiber retaining channels. Applicant respectfully submits that claims 24 and 26 are amended herein to more clearly describe “base grooves” as “fiber retaining grooves in the basechip” and “lid grooves” as “fiber retaining grooves in the lid chip.” Since Fig. 8 shows the features which are also described in the specification, for example at page 19, lines 2 through page 20, line 5, Applicant respectfully submits that each of the drawings are in condition for allowance and request withdrawal of the objections to the drawings.

Claim Objections

Claims 46 and 47 are objected to because the Patent Office found antecedent problems with “the roller element.”

Claims 46 and 47 are amended herein to correct the antecedent problems with “the roller element” by changing the term to “a roller element” or “said roller element” where appropriate. Accordingly, Applicant respectfully requests the Patent Office to withdraw its objection to claims 46 and 47.

Claims 49-51 are objected to because “the applicant should consider changing “relative to” and “related to” to “--to match--.”

Claims 49-51 are amended herein to change the terms “relative to” and “related to” to “to match” according to the Patent Office’s suggestion to more clearly describe the invention. Accordingly, Applicant respectfully requests the Patent Office to withdraw its objection to claims 49-51.

Rejections Under 35 U.S.C. §112

Claims 1-37, 48-51, 59-62, 65-66 and, 69-70 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Patent Office indicated that in line four of claim 1, the “fiber-retaining channel disposed therein” is confusing. Applicant respectfully submits that claim 1 is amended herein to change the term “therein” to “in each substrate” in order to particularly point out the invention claimed in claim 1.

The Patent Office indicated that the terms “registration” or “register” in claims 2, 10, 18, 21, 27, 59-60 and, 69-70 are a relative terms, which render the claims indefinite. Applicant respectfully submits that, contrary to the Patent Office’s characterization, the terms “registration” or “register” as used in the present application are not relative terms and one of ordinary skill in the art would be reasonably apprised of the scope of the

invention. Accordingly, Applicant submits that the rejections of claims 2, 10, 18, 21, 27, 59-60 and 69-70 under 35 USC §112 are improper and should be withdrawn.

The Patent Office indicated that the terms “communicates” or “communication” in claims 16, 19 and, 61-62 are relative terms, which render the claims indefinite. Applicant respectfully submits that, contrary to the Patent Office’s characterization, the terms “communicates” or “communication” are not a relative terms and one of ordinary skill in the art would be reasonably apprised of the scope of the invention. Accordingly, Applicant submits that the rejections of claims 16, 19 and 61-62 under 35 USC §112 are improper and should be withdrawn.

The Patent Office indicated that claims 24, 31 and, 65 are unclear. Applicant respectfully submits that claims 24, 31 and 65 are amended herein to clearly identify the grooves that provide channels as “fiber retaining grooves”.

Claims 26 and 33-34 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, amounting to a gap between the necessary structural connections. Applicant respectfully submits that claims 26 and 33-34 are amended herein to change the term “relative” to “opposite”. Applicant submits that such non-narrowing amendment renders claims 26 and 33-34 allowable under 35 USC, 112 second paragraph.

The Patent Office indicated that claims 23 and, 28-29 are indefinite because it is unclear how one channel can be comprised of a plurality of channels. Applicant respectfully submits that claims 28 and 29 are amended herein to delete the term “a plurality of”. The term “plurality” does not occur in claim 23. Applicant submits that the term “at least one channel” means one or more channels. Applicant submits that the meaning of the claims are clear as they stand amended because, technically, both one dimensional arrays and two dimensional arrays can each include a single fiber. Applicant respectfully submits that it would be impractical to further parse the claims to provide better antecedent basis to the term “one or more”. Since the claims as amended are technically correct, Applicant respectfully requests the Patent Office to withdraw his objection to claims 23, 28 and 29.

The Patent Office indicated that the terms "is related to" or "relative to" in claims 48-51 are relative terms, which render the claims indefinite. Applicant respectfully submits that claims 48-51 are amended herein to change the term "relative to" to "to match" and "is related to" to "matches".

Applicant respectfully submits that each of the Patent Office's rejections under 35 USC, Section 112, second paragraph are overcome by the present non-narrowing amendment. Accordingly, applicant respectfully requests that the Patent Office withdraw its rejections under 35 USC, Section 112.

Rejections under 35 U.S.C. § 103

Claims 1-2, 5, 11-14, 17-18, 22-24, 28-30, 35 and, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplow et al in view of Laor (US 6101299).

The Patent Office indicated that Kaplow discloses a fiber optic array switch wherein each substrate comprises a front and rear face with the front faces facing each other (Fig. 4A) and a fiber-retaining channel (unnumbered Fig. 4A & 49) disposed in the front faces. The Patent Office admitted that Kaplow does not disclose that the fiber-retaining channel extends from the front face to the rear and indicated that Laor discloses a fiber optic array switch (10) with fiber retaining channels (22) extending from the front face to the rear face of first (16) and second (18) substrates. The Patent Office indicated that it would have been obvious to a person of ordinary skill in the art to extend the fiber-retaining channels of Kaplow from the front to rear of the substrates as done by Laor.

Applicant respectfully submits that contrary to the Patent Office's characterization, Fig. 4A of Kaplow does not teach or suggest the claimed element of a fiber optic array switch comprising substrates having "a front end and opposing rear face, the front faces of each substrates disposed in facing relation to one another" wherein "at least one fiber-retaining channel disposed therein extending from the front face to the rear face" as claimed in Claim 1. Rather, Fig. 4A of Kaplow is a perspective view of a connector which may be used to connect a circuit pack to a circuit pack enclosure (see column 2, lines 17-20). No face of the connector shown in Fig. 4A of Kaplow comprises "a female piece 38 which may be attached to a back

plane and male piece 37 which may be attached, for example to the circuit pack being removed. Optical beam 30 propagating along fiber or waive guide 41 located in v-groove 49 encounters ball lenses 45, 47 and then passes into the fiber or waive guide 42 on its way to an optical device in the circuit pack not shown. The ball lenses 45, 47 collimate and refocus the optical beam 30 minimizing signal loss across the connector. Signal 31 will pass through out ball lenses 48, 46 and into a fiber or waive guide 44.”

Also, contrary to the Patent Office’s characterization, the fiber retaining channels 22 of Laor which extend from the front face to the rear face of an opposing chasse configuration (see column 5, lines 25 to 27 and lines 44 to 48) when considered alone or when combined with Kaplow do not teach or suggest every element of Claim 1 arranged as in the claim. By describing fiber channels that are disposed, transverse to, or in the plane of opposing faces, and relative motion of fiber channels in axial directions rather than in transverse directions, Kaplow teaches away from the present invention.

“In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art and not based on Applicant’s disclosure.” MPEP 2142 citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Since neither Kaplow or Laor when taken alone or combined teach or suggest every element of claim 1, the Patent Office has not made out a *prima facie* case of obviousness under 35 USC 103 (a). Accordingly, Applicant respectfully submits that the Patent Office’s rejection of claims 1-2, 5, 11-14, 17-18, 22-24, 28-30, 35 and 37 should be withdrawn.

Claims 38-40, 45-46, 63-64, 71-73 and, 75-76 (as best understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Basavanhally et al (US 5337384) in view of Kaplow et al. (US 5440655). Applicant respectfully submits that contrary to the Patent Office’s characterization, neither Basavanhally nor Kaplow alone or when combined teach or suggest “a

first groove disposed along a first path within the front face of the first array; a second groove disposed along the front face of the second array; and a friction reducing element disposed in the first groove and intermediate the front face of the first and second arranges to reduce friction between the first array and the second array as the first array is displaced relative to the second array to effect switching" as claimed in claim 38. Rather, applicant submits that the grooves in Kaplow are not disposed in a front face as described and claimed in the present invention. The term front face as used in the present invention is used relative to the orientation of the optical fiber channels. See for example, specification page 6, lines 4 through 7, which recites "referring to Fig. 1, the arrays 101, 102 include respective front faces 113, 114 and respective opposing rear faces 115, 116, channels 107, 108 for retaining one or more fibers 112 extends through the body 118, or frame, of the arrays 101, 102, from the respective rear faces 115, 116 to the respective front faces 113, 114 of each array 101, 102." Applicant further submits that impermissible hindsight would be necessary to combine the grooves of Kaplow with the structure of Basavanhally even if such combination would teach or suggest all of the elements of claim 38.

Applicant respectfully submits that since no combination of references take alone or when combined teach or suggest each of the elements of claim 38 arranged as in the claims, the Patent Office has not made out a *prima facie* case of obviousness under 35 USC 103(a). Accordingly, applicant respectfully submits that the Patent Office's rejection of claims 38-40, 45-46, 63-64, 71-73 and 75-76 are improper and should be withdrawn.

Allowable Subject Matter

The Patent Office indicated that claims 41 44, 47, 52-58, 67-68 and, 74 are objected to as being dependent upon a rejected base claim; but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant gratefully acknowledges the Patent Office's indication that claims 41-44, 47, 52-58, 67-68 and 74 would be allowable if rewritten in independent form. Applicant respectfully defers said amendments to the objected to claims according to Examiner's instructions until after final disposition of all of the currently rejected claims.

The Patent Office indicated that claims 10, 16, 19, 21, 25-27, 31-34, 36, 48-51, 59-62, 65-66 and, 69-70 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C., 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Applicant gratefully acknowledges the Patent Office's indication that claims 10, 16, 19, 21, 25-27, 31-34, 36, 41-51, 59-62, 65-66, and 69-70 will be allowable if rewritten. Applicant respectfully submits that each of these claims are amended herein to overcome the rejections under 35 USC 112, second paragraph. Applicant respectfully defers further amendment to include all of the limitations of the base claim and any intervening claims until after final disposition of all of the currently rejected claims.

In view of the above, allowance of this application is now believed to be in order, and such action is hereby solicited. If any points remain in issue which the Patent Office feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below. The Patent Office is invited and encouraged to telephone the undersigned with any concerns in furtherance of the prosecution of the present application.

Please charge any deficiency as well as any other fees which may become due at any time during the pendency of this application, or credit any overpayment of such fees to deposit account No. 50-0369. Also, in the event any extensions of time for responding are required for the pending application(s), please treat this paper as a petition to extend the time as required and charge deposit account No. 50-0369 therefore.

Respectfully submitted,

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Appendix I

1. (Amended) A fiber optic array switch comprising:
 - first and second substrates, each substrate comprising:
 - a front and an opposing rear face, the front faces of each substrate disposed in facing relation to one another;
 - at least one fiber-retaining channel disposed [therein] in each substrate extending from the front face to the rear face; and
 - at least a first groove disposed along a longitudinal axis within the front face; and
 - at least one friction reducing element disposed within the first grooves of the first and second substrates, so that the first substrate may translate with respect to the second substrate along the direction of the longitudinal axis of the groove of the first substrate.
24. (Amended) The switch according to claim 23 wherein the linear array comprises a basechip having [base] fiber retaining grooves formed therein to provide the channels.
26. (Amended) The switch according to claim 24 wherein the linear array comprises a lidchip having [lid] fiber retaining grooves formed therein, and wherein the lidchip is positioned [relative] opposite to the basechip so that the [base] grooves of said basechip and the [lid] grooves of said lidchip are [registered] aligned relative to one another to provide the channels.
29. (Amended) The switch according to claim 1 wherein the at least one channel of the first substrate comprises [a plurality of] channels disposed in a two-dimensional array of channels.

30. (Amended) The switch according to claim 29 wherein the two-dimensional array of channels comprises [a plurality of] linear arrays of channels arranged to provide the two-dimensional array.

31. (Amended) The switch according to claim 30 wherein at least one of the plurality of linear arrays comprises a basechip having [base] fiber retaining grooves formed therein to provide the channels.

33. (Amended) The switch according to claim 32 wherein the linear array comprises a lidchip having [lid] fiber retaining grooves formed therein, and wherein the lidchip is positioned relative to the basechip so that the [base] fiber retaining grooves of said basechip and [lid] fiber retaining grooves of said lidchip are [registered] aligned to one another to provide the channels.

34. (Amended) The switch according to claim 33 wherein at least one of the basechip and the lidchip includes a probe and at least one of the other basechip and lidchip includes a complementary socket for [registering] aligning the basechip to the lidchip.

46. (Amended) The switch according to claim 38 wherein the first groove is dimensioned to match a selected dimension of [the] a roller element so that [the] said roller element is confined within the first groove during relative displacement of the first and second array.

47. (Amended) The switch according to claim 38 wherein the first groove comprises at least one detent dimensioned to temporarily hold [the] a roller element in a certain position within the first groove to permit the first and second array to be aligned relative to each other.

48. (Amended) The switch according to claim 47 wherein the first array comprises a plurality of fiber channels arranged in a preselected number of rows of fiber

channels, and wherein the number of detents in the first groove [is related to] matches the preselected number of rows of fiber channels.

49. (Amended) The switch according to claim 48 wherein the detents are spaced [relative to] to match the pitch of the rows of fiber channels.

50. (Amended) The switch according to claim 48 wherein the second array comprises a plurality of fiber channels arranged in a preselected number of rows of fiber channels, and wherein the second groove cooperates with the first groove of the first array and the second groove includes at least one detent, the number of detents in the second groove [related to] matches the preselected number of rows of fiber channels in the second array.

51. (Amended) The switch according to claim 50 wherein the detents in the second groove are spaced [relative to] to match the pitch of the rows of fiber channels of the second array, so that locating the roller element in respective detents of the first and second arrays provides registration between respective fiber channels of the first and second arrays.

65. (Amended) The switch according to claim 64 wherein the first array comprises a chip having fiber retaining grooves formed therein to provide the channels for holding fibers of a fiber array.